REMARKS

In the Final Official Action dated April 21, 2006, Claims 48 and 51-60 are pending and under consideration on the merits. Claim 59 is allowed. Claims 48, 51-58 and 60 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly lacking descriptive support. Claims 48, 51-58 and 60 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly lacking enabling support.

This Response addresses each of the Examiner's rejections. Applicant therefore respectfully submits that the present application is in condition for allowance or at least in better condition for appeal. Favorable consideration of all pending claims is therefore respectfully requested.

Claims 48, 51-58 and 60 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly lacking descriptive support.

Specifically, the Examiner maintains that the histidine-rich motifs provided in Exhibits 1-7 previously submitted by Applicant demonstrates that the motifs are similar among plant species, but not identical. The Examiner asserts that the way in which claim 48 has been amended is such that the claimed nucleic acid need only have one of SEQ ID NOs: 6, 12 and 20. The Examiner notes that claim 60 recites a nucleic acid that hybridizes to a nucleic acid encoding SEQ ID NOs: 6, 12 and 20. However, the Examiner alleges that no stringency conditions are provided in claim 60, and that the claim does not require that the nucleic acid comprise SEQ ID NOs: 6, 12 and 20. In addition, the Examiner relies on certain sequence search results. The Examiner states that a search of the histidine motifs indicated that the motifs represented by SEQ ID NO: 12 and 20 are present in many other genes that do not code for delta-6 desaturases. While acknowledging that identical matches to SEQ ID NO: 6 were all delta-6 desaturases, the Examiner contends that sequences having SEQ ID NO: 6 but with only one or two amino acid substitutions include enzymes other than

delta-6 desaturases. Therefore, the Examiner alleges that the recitation of the three histidine-rich motifs, and particularly any one of these motifs, is not sufficient to describe a delta-6 desaturase.

In response, Applicant respectfully submits that the present invention is based on the isolation and identification of the first two delta-6 desaturase-encoding sequences from plants.

Applicant respectfully submits that the specification describes, by way of examples, the *Borage* and *Evening Primrose* delta-6 desaturase coding sequences. Moreover, the specification describes structural characteristics of a delta-6 desaturase encoded by the claimed nucleic acid molecule. In particular, Applicant directs the Examiner's attention to page 39, lines 12, 13, and Table 3 of the specification, where the specification teaches structural motifs in the *Borage* delta-6 desaturase, namely, the Lipid Box, the Metal Box 1, and the Metal Box 2. Furthermore, Applicant submits that the specification specifically describes that all plant membrane bound desaturases "possess histidine rich motifs." See page 48, lines 26-28, and page 49, lines 2-12 of the specification. The specification also teaches that the histidine rich motifs are identified in the evening primrose sequence, which are virtually identical to those found in borage delta 6-desaturase. *Id.* The specification particularly describes that the three histidine-rich motifs are common structural features that present in all plant delta-6 desaturases. See, e.g., the specification, at page 48, lines 26-27. In addition, the specification discloses, at page 11, lines 27, 28 and page 12, lines 1-11, that DNA sequences encoding plant delta-6 desaturases can be isolated by hybridization based on the *Borage* or *Evening Primrose* delta-6 desaturase DNA.

Applicant respectfully submits that the present invention recognizes that the three histidine-rich boxes from borage or other plant species have distinct sequences, which are distinct from the corresponding motifs that are conserved in all other member-bound desaturases,

e.g., delta-12 and delta-15 desaturases or delta-6 desaturases in species other than plants. See, e.g., Table 3 of the specification. Applicant submits that the identification of another plant delta-6 desaturase from evening primrose is a further indication to one skilled in the art that the inventor was in possession of all plant delta-6 desaturases at the time the application was filed.

Applicant submits that prior to the present invention, it had been well recognized in the art that all membrane bound desaturases have three conserved histidine-rich sequences (i.e., histidine-rich motifs or histidine-rich boxes). See, e.g., Okuley et al. (*The Plant Cell*, Vol. 6, 147-58, January 1994), particularly Fig 1 A and Sperling et al. (*Prostaglandins, Leukotrienes and Essential Fatty Acids*, 68, 73-95, 2003), particularly Part 4 (copies of the reference were submitted with the previous response). Applicant submits that the conserved histidine-rich sequences need not be identical. Previously submitted Exhibits 1-7 demonstrate that all plant delta 6-desaturases have three histidine-rich boxes, which are distinct from the corresponding motifs that are conserved in all other member-bound desaturases. Thus, Applicant submits that Exhibits 1-7 corroborate that the present inventor had possession of the present invention in its full scope at the time the application was filed.

With respect to the Examiner's reliance upon sequence search results, Applicant submits that the mere fact that certain enzymes other than plant delta-6 desaturases happen to contain one or two motifs that are identical, or highly homologous, to SEQ ID NO: 6, 12 or 20, without more, is irrelevant to the present invention. The Examiner does not allege, nor can the Examiner provide any evidence that these enzymes other than plant delta-6 desaturases have all three histidine-rich motifs, which are recited by the claims of the present application. In this regard, Applicant also submits that the Examiner's assertion that the nucleic acid of claim 48 need only have one of SEQ ID NOs: 6, 12 and 20 is inaccurate. Claim 48 clearly recites that the

nucleic acid molecule encoding a plant delta 6-desaturase comprises three histidine-rich boxes. Claim 48 requires that one of three histidine-rich boxes is identical to SEQ ID NO: 6, 12 or 20.

Accordingly, Applicant respectfully submits that the specification discloses sufficiently detailed and relevant identifying structural features of the claimed molecules, e.g., the function of the encoded protein as a plant delta-6 desaturase (determined by an enzymatic assay as disclosed), the three histidine- rich boxes, and the hybridization features. Those skilled in the art would understand that Applicant had possession of a DNA encoding a plant delta-6 desaturase at the time the application was filed.

However, in view of the after-final stage of prosecution, Applicant has canceled claims 48, 58 and 60, without prejudice, in an effort to favorably advance the prosecution. Applicant has also amended claims 51-57 to depend on claim 59, which has been allowed. Thus, the rejection of claims 48, 58 and 60 is moot. Applicant reserves the right to file a continuation application to pursue the subject matter of claims 48, 58 and 60 and a broader scope of claims 51-57.

In view of the foregoing, Applicant respectfully submits that the present application fully complies with the written description requirement under 35 U.S.C. § 112, first paragraph, and the rejection of Claims 48, 51-58 and 60 under 35 U.S.C. §112, first paragraph, is overcome. Withdrawal of the rejection is respectfully requested.

Claims 48, 51-58 and 60 are rejected as allegedly lacking enabling support. The Examiner acknowledges that the specification enables isolated nucleic acid sequences that encode a delta-6 desaturase from the plant species: evening primrose and borage, and from Synechocystis and cyanobacteria. However, the Examiner alleges that the specification does not provide enablement for any delta-6 desaturase from any species. The Examiner alleges that it

would require undue experimentation to make and/or use the invention as broadly claimed for the reasons of record in the last office action.

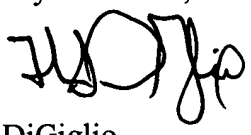
In the first instance, Applicant respectfully observes that the Examiner appears not to have fully considered Applicant's amendments and arguments made in the previous response. Applicant submits that the claims, as presented, recite a plant delta-6 desaturase and no longer recite any delta-6 desaturase from any species. Applicant submits that based on the teaching in the specification, those skilled in the art would be able to identify a plant delta-6 desaturase gene, without undue experimentation.

However, in an effort to favorably advance the prosecution, Applicant has canceled claims 48, 58 and 60, without prejudice. Thus, the rejection of claims 48, 58 and 60 is moot. Applicant has also amended the claims 51-57 to depend on claim 59, which has been allowed.

Accordingly, the rejection of Claims 48, 51-58 and 60 under the enablement requirement of 35 U.S.C. §112, first paragraph, is overcome. Applicant respectfully requests withdrawal of the rejection based on the enablement requirement.

In view of foregoing amendments and remarks, it is firmly believed that the subject application is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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